

TECHNOLOGIES, DOCTRINE, AND ORGANIZATION

for RMA

By JAMES K. MORNINGSTAR



115th Mobile Public Affairs Detachment (David Burke)

Javelin anti-tank
weapon system.

Major James K. Morningstar, USA, has served in a variety of armor and cavalry assignments and is a Second Fleet plans officer (J-51) on board USS Mount Whitney.

To fully realize the revolutionary potential of new military technology we must develop doctrine that incorporates innovative operational concepts as well as organizational structures that are joint, deployable, and informationally smart. Technological upheaval is already reverberating throughout many critical military functions. As a result doctrine must reflect changes in time and space relationships on the battlefield, the balance between capability and manpower, and the nature of command and control. This article examines these changes and organizational structures capable of integrating new technologies and maximizing their warfighting potential.

To understand the need for change, we must first grasp its causes. New technologies are reconstructing the world. Just as military institutions reflect society, they also experience change. Computers, digital technology, and improved performance of equipment are creating enhancements in many areas. Tomorrow we will shoot, move, and communicate differently than we do today.

Increasing the Tempo

Perhaps the most visible effect of modern mechanics is firepower. The Gulf War left us with images of smart missiles flying thousands of miles before destroying selected targets. But the lasting importance may be their impact on operational

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tempo rather than their destructiveness. To appreciate the potency of precision munitions, one has only to compare the amount of ordnance employed to destroy targets in past wars. While it took several hundred bombs to destroy a bridge during World War II it takes only one guided bomb today. This simple fact has tremendous repercussions for speed in combat. In World War II it took an extensive air campaign to destroy several bridges; a few aircraft can do it in hours now. Commanders must be ready to move to the next phase of operations much faster than they did fifty, thirty, or even ten years ago. Increased accuracy has robbed planners of the time to adjust to evolving conditions.

During Desert Storm we attacked Iraqi defenses with a preparatory bombardment of high-explosive artillery rounds followed by concentrations of conventional rounds from Abrams tanks and Bradley fighting vehicles. Physically the attack was a refined version of the sort conducted

in the fields of France over seventy years earlier. In the application of weapons, only the addition of attack helicopters would have distinguished it from *Blitzkrieg* in 1939. Allied forces were

overrun by the Germans because their leaders were accustomed to a horse cavalry and foot soldier pace of combat. In the future, anyone whose operational tempo is at the dumb bullet speed of battle will fall behind in a combat parade where precision munitions call the cadence.

Precision munitions must lead us to revise our doctrinal definitions of battlespace. Ground forces have always been responsible for the terrain that they effectively covered with fire. In the past the range of weapons, the probability of kill per weapon, and the number of systems available limited that effectiveness over space. A tank company commander in the defense would position his vehicles to mass fires within range on a particular piece of ground where an enemy was likely to cluster. He would have to rely on terrain or obstacles to force enemy forces into a kill sack and use mass fires to increase the likelihood of destroying targets. The more bullets fired at a point, the better the chances of a hit. This meant that the area beyond his focus would have to be addressed by artillery, air support, or other means. Likewise each artillery piece would wait until forward observers spotted enemy forces on one targeted area so they all could fire together and increase the probability of hitting targets. Battlespace has been a slave of weapon precision.

Guided tactical munitions will emancipate our use of the battlespace. Smart projectiles will enable tanks and artillery to fire in the direction

of an enemy and allow the round to spot its own target. These systems will eventually achieve an expected performance level of one kill per round. Target areas will no longer depend on terrain; they will encompass the entire battlespace. Accurate fire-and-forget systems such as the anti-tank Javelin will enable commanders to deploy skirmishers far beyond the main line of defense, thus increasing their coverage of terrain. Former delineations of area responsibilities by weapon systems will become indistinguishable.

Guided munitions will bring other players to the tactical battlefield. Because of difficulties in coordinating accurate application near friendly troops, only the far reaches of battlefields have experienced many powerful long-range systems. This will change as new, highly accurate cruise missiles begin to support commanders. Someday a Ranger unit pinned down by a machine gun from a nearby highrise may call upon support from a GPS-guided tactical cruise missile launched from a ship. Elsewhere, a corps may fire missiles at strategic objectives which other services or the National Command Authorities (NCA) want destroyed. As the military learns to do more with less, interservice support will be common on lower levels of command.

When the Navy and Air Force adopted guided missiles they learned to incorporate defenses against such weapons. Systems such as rapid blooming on board chaff and anti-missile electronic jamming equipment are present on all Navy ships. In the future special vehicles will carry such devices to protect against enemy missiles. Armor, infantry, air defense artillery, and the Signal Corps will compete for the control of such systems.

A second radical change in perceptions of battlespace results from robotic reconnaissance. As units apply combat power at greater ranges, they must see at greater ranges. In many cases these distances exceed the supportable limits of scouts. Already unmanned aerial vehicles (UAVs) can provide reconnaissance imagery down to units in the field. Digital links will provide real time pictures from airborne platforms such as Navy UAVs and Army and Air Force joint surveillance target attack radar system (JSTARS) capabilities to ground headquarters as they maneuver against an enemy. Soldiers will one day carry small screens displaying symbolic representations beamed from satellites showing what lies over the horizon. Accurate intelligence pictures that higher headquarters could once only dream of will be available to front line troops.

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New Possibilities

Technology has also altered combat by increasing potential rates of movement. Vehicles like M-1 Abrams tanks are fully 33 percent faster than their predecessors. The effect on maneuver is obvious, yet the effect on command and control is perhaps more subtle but decisive. General Schwarzkopf's maneuver known as the "Hail Mary" displayed the unprecedented ability of large forces to displace over great distances at speeds that outpaced the enemy's ability to react. Field headquarters must not only plan and conduct these rapid operations but also physically move with them. Modern rates of speed can have a similar concrete impact on other operations. Since C-17s fly as much as 50 percent faster than C-130s, planners must ensure that cargo does not pile up at airheads. Greater speeds allow wider maneuvers that, in turn, require more bulk fuel. Increased speed of action intensifies the planning and coordination burden carried by staffs.

Traditional ideas for employing forces give way to new possibilities introduced by technical advancements. The V-22 Osprey and similar aircraft may make it routine for infantry companies to move five hundred miles per day. Remotely piloted aircraft firing guided munitions may be their primary source for reconnaissance and fire support at such ranges. Headquarters for such units will need specialized abilities to command and control these operations.

Enhancements in command and control are already upon us. Digital and computerized communication systems now exist but only as a preview of what lies ahead. Voice encryption is evolving into burst transmissions of pre-format-

ted reports. Computers on vehicles will allow crew members to key in or select from menu items that software will in-

corporate into report formats and send at a touch of a button to headquarters. Future versions will allow headquarters to extract information from sensors on the vehicle without bothering crew members with extraneous reports. Position location devices on supply trucks, for example, will routinely report to a headquarters where a computer screen display will enable commanders to see where their assets are at any given time. Adapting existing technology will allow trucks to carry digital maps that can help drivers see their location, select routes in unfamiliar areas, and keep track of units around them. Beyond that drivers will be able to update screens by noting obstacles, report enemy positions, or even depict the delivery of supplies and transmit that information via computer net to other screens. One

day such systems will have voice synthesizers that verbally draw attention to informational changes so that drivers need not constantly watch screens. Combat and peacekeeping units will wonder how they ever got along without such systems for maintaining common situational awareness.

Digital communications will change many aspects of military operations. Because they will augment rather than completely replace radio systems, technical and logistical support to field units will necessarily increase. Most importantly the information flow between communication nodes will become a torrent in all directions, placing greater strain on decisionmakers. Consider that there currently exist technologies by which medics at accident sites can hook up by TV to experienced doctors at hospitals to receive guidance and prepare hospitals for incoming casualties. The medics can pass vital signs digitally to emergency rooms, saving critical time. Imagine that type of system with SEAL teams on patrol, F/A-18 cockpits on a bombing run, or fire support teams at outposts, talking directly to headquarters as NCA monitors from around the world. Picture the sheer volume of information pouring into a brigade headquarters from above and below as automated digital reports arrive at light speed. It is easy to envision brigade commanders having to fight the urge to bypass less experienced battalion and company commanders to guide platoon leaders at objectives via direct digital links. The increasing volume and velocity of information raises the need for more understanding on the part of receivers. For decisionmakers to understand the variety of incoming data, they must have people with specialized knowledge available to translate that data into usable information. This requires innovation in the way we operate.

Time, Space, and the Battlefield

Emerging technologies are driving doctrinal changes in battlefield time-space relationships, the balance between combat power and manpower, and the nature of command and control. Yet perhaps the greatest change is occurring in our concepts of time-space relationships on the battlefield. We have built our warfighting structure on doctrine composed of tactical, operational, and strategic layers. Recent publications such as the universal joint task list define war on three levels: strategic, national security objectives; operational, campaigns and major operations; and tactical, battles and engagements. These levels evolved over centuries and involved large armies with limited weapon ranges and ponderous rates of movement. Advancements today have cracked such doctrines.

emerging technologies are driving doctrinal changes in battlefield time-space relationships



U.S. Navy (Wayne W. Edwards)

Tomahawk being
launched from
USS Laboon.

Modern range, speed, and method render older notions of battlefield spatial responsibilities no longer meaningful. A Marine expeditionary unit is only a tactical level unit of battalion size; yet we can introduce it on foreign shores to secure an embassy on what is essentially a strategic level operation. In recent joint exercises we have deployed tactical level single airborne battalions and small groups of attack helicopters on operational level deep attacks. Future commanders in ground fights on the tactical level will have the ability to receive fire support from new Navy arsenal ships firing operational level munitions such as cruise missiles.

Drawing tactical-strategic distinctions from tired ideas about maneuvering within or beyond weapon ranges is no longer practical. The doctrinal battlespace responsibilities allotted to different levels of command are based on the ability to see and affect an enemy. In large measure they result from an outdated concept of strategy and tactics. FM 100-5, *Operations*, defines strategy as, "The art and science of employing the Armed Forces and other elements of national power during peace, conflict, and war to secure national objectives." It also defines tactics as, "The art and science of employing means to win battles and engagements." The difference between the two is largely in the scale of operations. One can see how in war strategy can beget tactics—that is, national authorities position forces that fight the battles. To fill the gap between them we adopted a convoluted idea of operational art contained in FM 100-5: "The employment of military forces to attain strategic goals, through the design, organization, integration, and execution of battles and engagements into major campaigns and major operations. In war operational art determines when, where, and for what purpose major forces will fight over time."

To understand these concepts requires research into their origins. Having done that, let's cut straight to the chase. In his seminal 1835 manual, *Infantry Tactics*, General Winfield Scott opened these definitions from von Bulow:

I call strategy the hostile movements of two armies made beyond the view of each other; or—if it be preferred—beyond the effect of cannon. Tactics I call the science of movements which are made in the presence of the enemy, that is, within his view and within the reach of his artillery.

The contemporary division of doctrine into three levels of war, with its appropriate segregation of responsibilities, is a logical extension of Scott's ideas.

We can start to create a new foundation by understanding that strategy and tactics exist on all levels of war. Strategy is the positioning of combat power to influence the will of a competitor. Tactics is the application of fire power to defeat enemy force. A company commander employs strategy by sending a platoon around an enemy's flank. A coalition commander applies tactics by destroying airfields with cruise missiles. Regardless of the level of combat, the principles are the same. The attempt to categorize units as levels on the battlefield prevents developing interoperable organizations. The Marine expeditionary unit can never be organized to conduct a

national mission if the unit is not considered to be on the proper level even though future technology may give it the tools and reduced force levels may give it the mission.

Adjusting organization to technology must begin with compensating for tempo. Just as we learn from physics, time as defined in terms of rate of movement and distance grows smaller as rate increases. We have seen that technology has expanded the rate of battlefield events, decreased the resultant time, and accelerated the potential tempo of operations. The speed of decisionmaking is fairly constant though dependent on information. If there is less time we tend to make fewer good decisions and more hasty ones. We can compensate by anticipating events. In effect we think at greater distances to compensate for the pace of events. The increased range in weaponry, reconnaissance, and communication have enabled us to keep this balance so far. It is only a matter of time until we surmount the limits of small unit commanders to effectively command and control the space over which they make decisions. Only refinement in organization can ensure that decisionmaking keeps pace with the tempo of operations.

More with Less

It is commonly claimed that the Armed Forces are required to do more with less. That is not good if you are a commander with less. Force reductions have altered the routine at the National Training Center

where brigades now routinely bring two battalions rather than three. In joint task force exercises we commonly have battalion-sized elements conducting

forcible entry operations which doctrine says they are not large enough to do on their own. In these exercises it is normal for marines to experience a lack of air cover at times because we train with one carrier wing instead of two and it requires flight deck down time. Reduction in strengths and budgets causes alterations in training, forcing small units to take on larger missions. While our stated goal is always to train as we fight, we must face the more likely reality that we must fight as we train.

Technology has always enabled units to do more with less. The number of men required per mile of a line dropped dramatically when rifles replaced smooth bore muskets. The number of aircraft required to destroy a target fell when missiles and later smart munitions replaced bombs. What

once was the task of lines of battleships is now accomplished by one aircraft carrier. In each case the new unit needed fewer men, aircraft, or ships because it had control of rifles, missiles, or planes. Missions formerly reserved for divisions will be accomplished by smaller units if those units can control the sources of modern combat power.

As technical advances increase the ratio of firepower per man, the capability to apply that firepower effectively must stay abreast. Increased communications will enable the command and control required to manage the sources of combat power. When it becomes necessary to conduct forcible entry operations with battalion-sized units, the troops can coordinate combat power from multiple sources provided that they know where to look and what they need. Imagine an airborne battalion seizing a vital location as an Aegis cruiser provides air defense, Air Force JSTARS relays information on nearby troop movements to the commander on the ground, and an airborne joint targeting cell coordinates long range air and missile fire support to isolate the area of operations. Forcible entry with smaller units is possible provided unit commanders have joint combat power support at their fingertips.

Today the sources of joint combat power are collocated at the highest levels of command. Marine battalions cannot conduct forcible entry operations without adequate combat power. In a typical scenario, a battalion commander ashore needs to coordinate pre-planned air support through the staff of an amphibious task force afloat in the amphibious readiness group. They in turn pass the request through the joint force air component commander, usually located with the staff of the JTF commander aboard another ship. They would apportion support through an air tasking order some 72 hours in advance. The order is then sent to the carrier battle group whose air wing would fly the mission. Future communications may make it easier to coordinate such support, but the chain of control must change to facilitate the battalion commander at the front.

Futurists Hiedi and Alvin Toffler note that the "de-massification" of production systems is a trademark of effective third wave societies. As we embrace technologies we must also adapt to use them. One of the most important military adaptations will be the de-massification of the production of combat power. Smaller units must be able to use modern means to produce more combat power by applying joint sources. This translates into the need to reconstruct command organizations to provide the small unit commander with the expertise to use this combat power and still not suffer paralysis from information overflow.

New command and control organizations can provide maximum battlefield effectiveness by

sources of joint combat power are collocated at the highest levels of command



U.S. Air Force (E.H. Lillejohn)

C-17 Globemaster III.

integrating new technology. Current structures are not well suited to efficiently utilize the firepower, maneuver speed, and communication abilities of the future battlefield. Army brigade headquarters, for example, are stretched to their limits by the high tempo environment of the National Training Center where commanders and staffs are overburdened. They must simultaneously fight deep with few reconnaissance assets, coordinate maneuver battalions, integrate sources of fire support, and oversee a range of logistics. The brigade command structure manages more diverse decisions with fewer people than other levels of command. Yet technological advances and manpower decreases will make such units the type deployed to accomplish future independent missions. The dilemma of new technologies is that they push combat potential beyond decisionmaking abilities.

The solution to this dilemma lies in organization. We must “de-massify” the production of

combat power while decentralizing decisionmaking. Added levels of command and control with specified responsibilities and specialized functions will enable the combat brain to keep pace with the growing strength of the combat body. An examination of a possible command and control structure for an Army brigade provides an example of incorporating new technologies and doctrine to fully realize the promise of RMA.

Redistributing Responsibilities

To ease the burden of decisionmaking on brigades it must be reorganized. This is not new: in Europe during World War II, the Army scrapped brigades in favor of combined arms formations known as combat commands. As the flow of battlefield information increases and combat power becomes more specialized, we must equitably redistribute responsibilities. Adding a headquarters to the chain of command would increase flexibility and responsiveness. Returning regiments to the chain, for example, would free brigades from coordinating maneuver battalions and allow them

to concentrate on applying combat power from multiple joint sources. Planning two levels down in accordance with doctrine, brigade headquarters would position battalions against enemy forces while regiments applied the combat power of companies. Brigades would predominantly conduct battlefield strategy while regiments would focus on battlefield tactics.

Under this organization brigade headquarters becomes the focal point for reconnaissance. As technology brings satellite and airborne intelligence to the brigade, increased staff specialization will be needed to translate data into usable information. This intelligence will drive the direction of ground reconnaissance assets. If JSTARS reports a mass of vehicles moving on an unexpected avenue of advance, a brigade commander will want observers to cover that route. This necessitates collecting scout platoons from battalions to form a scout company brigade control. Such a unit will also have platoons for UAVs and robotic reconnaissance assets which illustrates "de-massification" at battalion level and creation of specialized units. Adding fire-and-forget anti-tank missiles will allow battalions to adopt skirmish units to conduct missions normally done by scout platoons.

Brigade staffs will require greater specialization. Force XXI concepts rely on modules of units from which to quickly tailor forces to suit a mission. Staffs can do the same. If an airborne brigade were jumping to seize an airfield near a coast and then conducting operations with a Marine expeditionary unit assaulting from the sea, that brigade staff should receive augmentation to enable command and control. Imagine augmentation staff liaison modules assigned to division that are chopped to brigade for such missions. These would include Air Force liaisons, air and naval gunfire liaisons, theater ballistic missile defense representatives to coordinate with offshore Aegis missile cruisers, liaisons for national intelligence assets, and other specialists as required. Divisions would maintain working relationships between such specialists and brigade staffs in garrison training. Once deployed, digital communications would link liaisons to nodes of expertise and authority supporting brigade. Similar organizations would conduct tailored logistical support. The deployed regimental commander maneuvers battalions as brigade integrates combat power support. Until larger forces arrive on the scene, a brigade commander could act as a joint force land component commander.

Decisions are effectively distributed among a larger number of skilled people increasing the overall speed of action. The increased tempo from

this reorganization has a hidden benefit. Being faster than an enemy in any phase provides an edge in decisionmaking. Making faster decisions, the true aim of increased information, enables us to act faster than an enemy and decreases its ability to influence our operations. Force protection is thereby enhanced.

A digitally smart, joint, and deployable organizational structure and doctrinal innovations are only some examples of fully realizing the revolutionary potential of technologies. Changes are underway in how we shoot, move, and communicate. Resultant changes in relationships between battlefield time and space, combat power, and manpower, and command and control have not been completely appreciated. To capture the potential of technology we must establish a better doctrinal basis in areas such as strategy and tactics and then organize to fight accordingly. Redefined levels of battlefield headquarters will increase the information flow and maintain cohesive direction while enhancing freedom of action. In an era of smaller forces, we must enable commanders to draw on joint resources to compensate for a loss of manpower. By de-massifying the production of combat power and decentralizing command and control we can increase specialization and the speed of the decision cycle and force protection through action. Force reductions will impose large missions on small units and technology will give such units the potential to accomplish missions. Only changes in doctrine and organization will give them the ability to succeed. **JFQ**

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